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1: J Aerosol Med. 2004 Summer;17(2):123-8. Related Articles, Links

Mary Ann Liebert,

The development of a novel high-dose pressurized aerosol dry-powder device (PADD) for the delivery of pumactant for inhalation therapy.

Young PM, Thompson J, Woodcock D, Aydin M, Price R.

Pharmaceutical Technology Research Group, Department of Pharmacy, University of Bath, Bath, United Kingdom.

The performance of a novel dry powder inhaler designed to deliver exceptionally high doses was investigated using pumactant as a model powder. Pumactant (a synthetic lung surfactant consisting of a phospholipid mixture), with a 90th percentile particle size of 2.92 microm is highly cohesive, has a high moisture affinity (6.2% w/w at 45% RH), and is predominantly amorphous. The device (pressurized aerosol dry-powder delivery [PADD]) utilizes pressurized gas to aerosolize a powder bed from a reservoir and delivers it through a conventional mouthpiece. The influence of loaded dose on dry powder delivery and can pressure on aerosolization efficiency was investigated. Analysis of the delivered dose studies suggested a linear relationship between loaded dose and delivered dose (R(2) = 0.96, for loaded doses of 0-250 mg), with a delivery efficiency of 70%. Analysis of the aerosolization efficiency using a Marple Miller type impactor suggested fine particle fractions (particles with an aerodynamic diameter of <5 microm) of approximately 30% using canister pressures of 8-14 bars. These results indicate that the PADD device may be a useful tool in delivering high-dose medicaments, as a carrier-free formulation, to the deep lung.

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